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REMOTE CONTROL BY CARRIER CURRENT

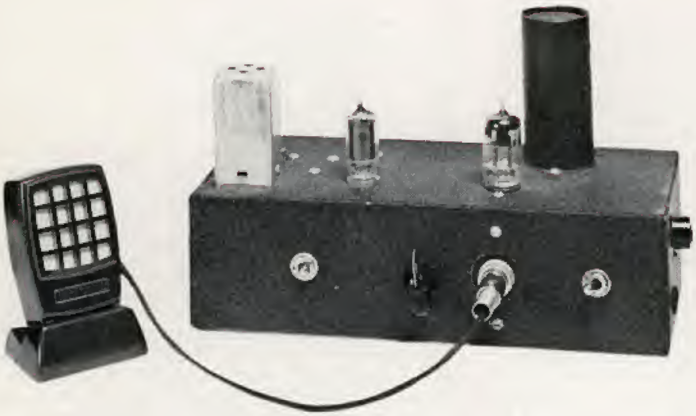

Fig. 1. With microphone plugged in, this remote control transmitter is ready to send control signals and audio over the a-c lines to its companion unit, the remote control receiver. This combination permits remote operation of any amateur transmitter. Pages 2, 3 and 4 give complete details.

SELENIUM RECTIFIER POWER SUPPLIES

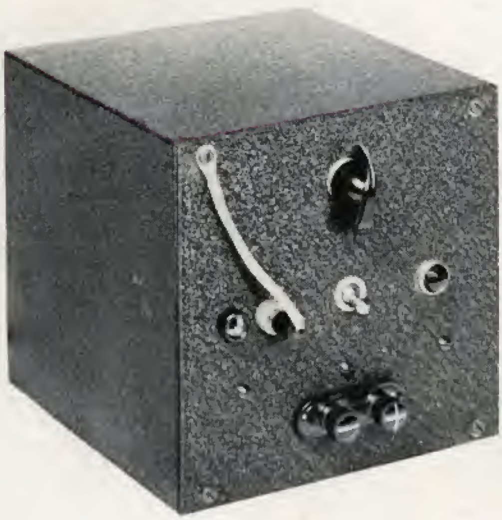

Fig. 2. A dual-voltage transformerless power supply employing G-E selenium rectifiers. The front panel switch changes the circuit from a doubler to a tripler, so that either 250 or 325 volts (approx) is available. This type of supply is ideal for portable work or for use around the shack as a utility power supply. A similar power supply designed especially for use as a bias supply is also described on pages 5, 6 and 7.

REMOTE CONTROL BY CARRIER CURRENT

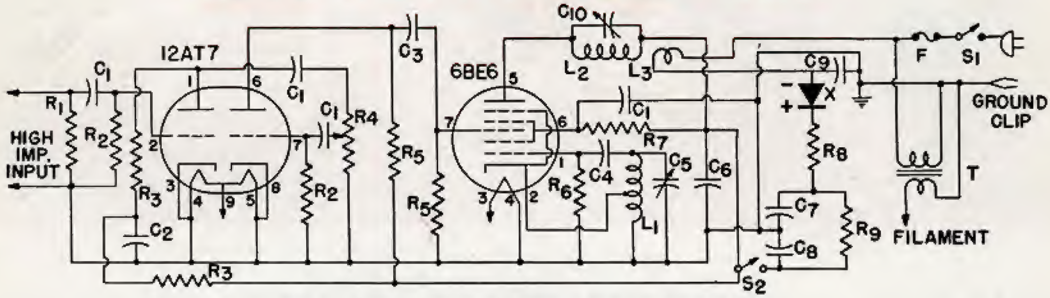

Fig. 3. Circuit Diagram of Remote Control Transmitting Unit

CIRCUIT CONSTANTS

C_1 = 0.01 mf paper
C_2 = 8 mf 450 volt electrolytic
C_3 = 0.05 mf paper
C_4 = 100 mmf mica
C_5 = 100 mmf variable (Hammarlund APC-100)
C_6 = 0.001 mf mica
C_7 = 20 mf electrolytic (part of C_8), 450 volt
C_8 = 60 mf electrolytic, 20-20-20-20, 450 volt (Sprague EL420)
C_9 = 0.1 mf paper
C_{10} = Trimmer in i-f transformer
F = 1.5 amp fuse
L_1 = 2.5 mh r-f choke, tapped at one pie
L_2 = One-half of 456 kc i-f interstage transformer (Meissner 16-6659)
L_3 = 10 T No. 20 wire (see text)
R_1 = 1 meg ½ watt
R_2 = 10 meg ½ watt
R_3 = 50,000 ohm ½ watt
R_4 = 1 meg potentiometer
R_5 = 0.1 meg ½ watt
R_6 = 20,000 ohm ½ watt
R_7 = 2000 ohm 1 watt
R_8 = 100 ohm 1 watt
R_9 = 1000 ohm 2 watt
S_1, S_2 = SPST toggle switch
T = 6.3 volt 1.2 amp (Stancor P-6134)
X = 100 ma selenium rectifier (G-E 6RS5GH1)

Every ham, at one time or another, has felt the need for remote control of his transmitter. This may come about because the new QTH has less room for the rig. Or, it may be that tuning up that new beam requires control of the transmitter from the top of a pole. A unit to accomplish this sort of thing may also be used as a remote pickup for a phonograph amplifier, and it may also be pressed into service as a one-way calling or paging system.

Two separate units, the remote transmitter unit and the remote receiving unit, interconnected only by the a-c line, permit remote control switching and remote transmission of an audio signal. Fig. 1 shows the front view of the transmitting unit and Fig. 5 indicates the general layout of the receiving unit.

CIRCUIT DETAILS
TRANSMITTING UNIT

The schematic diagram for the transmitting unit is shown in Fig. 3. This unit consists basically of an r-f oscillator and amplifier at 455 kilocycles, and a speech preamplifier and modulator. The 6BE6 is the r-f oscillator and amplifier. C_4, C_5, R_6 and L_1 comprise a conventional Hartley oscillator which is tuned to 455 kc by means of C_5. The r-f amplifier circuit consists of C_{10}, and L_2, which is tuned to the same frequency. This r-f is coupled to the a-c line by means of coil L_3. The 455 kc energy is thereby imposed directly on the 115 volt a-c line. The low impedance of L_3 enables the unit to be practically unaffected by the electrical load on the a-c line. (AVC in the receiving unit further insures no effect by the lighting load.)

The 12AT7 double triode serves as a speech preamplifier and modulator. The first section is designed to take any high impedance device, such as a crystal or dynamic microphone, or the usual type of phonograph pickup. The second section of the 12AT7 acts as a suppressor-grid modulator for the 6BE6. Control R_4 governs the per cent of modulation.

A self-contained power supply using a G-E selenium rectifier is shown. R_8 is the current limiting resistor and C_7, R_9 and C_8 comprise the filter system. The a-c connections themselves are discussed under "Construction." Switch S_1 is the usual on-off switch and S_2 is the carrier control switch which acts as the remote signaling switch.

CIRCUIT DETAILS
RECEIVING UNIT

In the receiving unit we have an r-f amplifier and detector, and a relay tube. The 6BA6 picks up the 455 kc energy from the a-c line in the L_1, L_2, C_8 combination, amplifies the r-f signal and passes it on to transformer T_2. The output of T_2 is coupled to the diode section of the 6BF6 which is used to obtain AVC bias for the 6BA6. In addition, this output is coupled through C_1 to a germanium crystal diode, W, which serves as the second detector.

This crystal diode also provides a positive voltage which, through the filter R_4, C_4 reduces the effective bias on the triode section of the 6BF6 to the point where sufficient plate current flows to actuate the relay (RY). Audio is obtained through the filter R_6, C_2 and output volume control R_7.

OPERATION AND ADJUSTMENT

There is very little work involved in lining up these two units. First, plug them into the power line so that both units are at the same point. Turn on switch S_1 on the transmitter unit and switch S on the receiving unit, and allow the filaments to warm up. Next, turn on switch S_2 on the transmitter unit. This should cause the transmitter to put out a carrier over the a-c line and the relay should make contact on the receiver unit. If the relay does not operate, adjust R_9 on the receiver unit until the relay throws on when S_2 is thrown on. The units are now

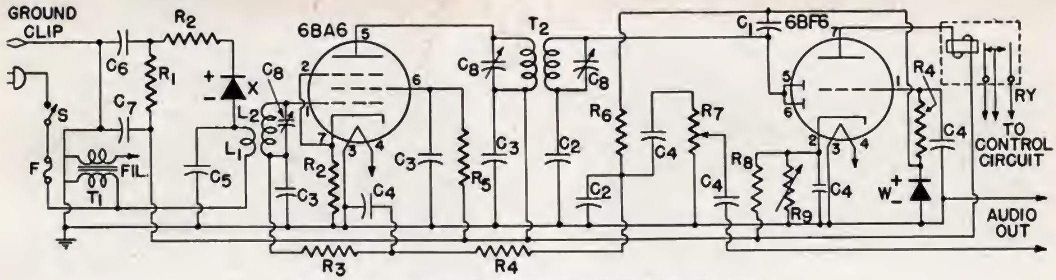

Fig. 4. Circuit Diagram of Remote Control Receiving Unit

CIRCUIT CONSTANTS

C_1 = 50 mmf mica
C_2 = 100 mmf mica
C_3 = 0.005 mf mica
C_4 = 0.01 mf paper
C_5 = 0.1 mf paper
C_6 = 20 mf electrolytic (part of C_7), 450 volt
C_7 = 60 mf electrolytic 20-20-20-20, 450 volt (Sprague EL420)
C_8 = Trimmer in i-f transformer
F = 1.5 amp fuse
L_1 = 10 T No. 20 wire (see text)
L_2 = One-half of 456 kc i-f interstage transformer (Meissner 16-6659)
R_1 = 500 ohm 1 watt
R_2 = 100 ohm ½ watt
R_3 = 0.1 meg ½ watt
R_4 = 2 meg ½ watt
R_5 = 5000 ohm 1 watt
R_6 = 50,000 ohm ½ watt
R_7 = 1 meg potentiometer
R_8 = 10,000 ohm 2 watt
R_9 = 2000 ohm wire-wound rheostat
RY = Sensitive relay, to operate on 5 ma
S = SPST toggle switch
T_1 = 6.3 volt 1.2 amp (Stancor P-6134)
T_2 = 456 kc i-f output transformer (Meissner 16-6660)
W = Germanium crystal diode
X = 100 ma selenium rectifier (G-E 6RS5GH1)

transmitting and receiving a radio-frequency carrier.

It is next necessary to peak the various i-f transformers so that the maximum carrier is transmitted. This may be done easily in one of two ways. The first method is to use a 10,000-ohm per volt voltmeter or a vacuum-tube voltmeter to measure AVC voltage. Put the 10,000-ohm per volt voltmeter on the 100-volt scale, or use any scale on the vacuum-tube voltmeter. Measure the voltage between chassis and the junction of resistors R_3 and R_4 on the receiving unit. The voltage appearing should be several volts.

With both units operating, adjust C_5 on the transmitting unit first for maximum AVC voltage. Then adjust the secondary of T_2 on the receiving unit with C_8 and following that adjust the primary of T_2 with its padding condenser. Next, adjust C_8 which is across L_2 on the receiving unit, and last trim up C_{10} which is on the transmitting unit. This procedure assures that all the i-f transformers are operating on the same frequency and giving the best signal possible.

Another tune-up procedure to be followed requires the use of an audio output meter. This meter is connected across the audio output posts on the receiving unit. A source of audio which puts out a constant amplitude signal must then be fed into the audio input on the transmitter. The audio output meter is then peaked in the same manner as described before by adjusting the frequency on the various i-f transformers.

Potentiometer R_7 on the receiving unit is the gain control which permits changing the audio level which comes out. Potentiometer R_4 on the transmitting unit is not a gain control, but adjusts the percentage of modulation of the 6BE6. Distortion increases rapidly as the voltage on the modulating grid of the 6BE6 increases beyond a certain point. The maximum setting of R_4 should therefore be one which allows no distortion on audio peaks. Of course, if this maximum point is marked, it is possible to go to lower settings, which will give some control over audio gain.

Once the units are operating properly, they may be separated and tried at remote points. There is sufficient signal strength for the units to operate over several blocks, if that is necessary. The audio output is more than sufficient to drive a speech amplifier or a phono amplifier in a radio.

CONSTRUCTION

Referring to the general views of the two units, Figs. 1 and 5, each unit is built into a 5 by 10 by 3 inch chassis. There is ample room for all the components, and a smaller chassis could be used. Fig. 1 shows the i-f can which contains L_2 and C_{10} placed on the left, with the 6BE6 and the 12AT7 in order to the right. The dual 40–40 mf electrolytic condenser is behind the 12AT7 tube. The switch on the left is S_1, the center control is R_4, and the audio input jack and S_2 are on the right.

The under-chassis view of the transmitting unit is shown in Fig. 7. The general placement of parts is

Fig. 5. Front View of Receiving Unit

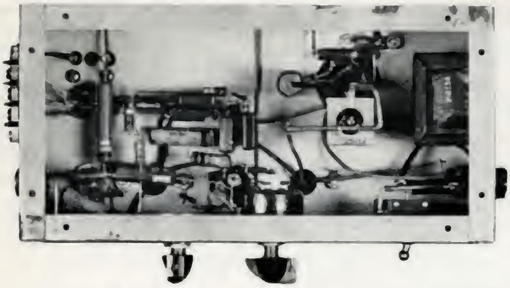

Fig. 6. Under View of Receiving Unit

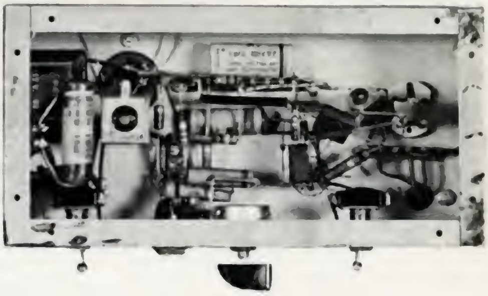

Fig. 7. Under View of Transmitting Unit

not critical, so that no special layout need be followed. Note that condenser C_5 is mounted on the underside of the chassis so that it is easily accessible to tune. It was necessary to ground the central metal structure on the 6BA6 socket to avoid self-oscillation.

Fig. 5 shows the general layout of the receiving unit, and the under-chassis view is shown in Fig. 6. The tubes and their associated i-f transformers, the electrolytic condenser, and the sensitive relay, are all mounted on top of the chassis. Front panel controls, left to right, are switch S, rheostat R_9 and potentiometer R_7, which is the gain control. On the side may be seen the audio output connector and the three-terminal block for making connections to the relay terminals for remote switching.

The a-c connections to the two units are shown with the a-c plug having only one connection, and a ground clip provided for the other connection. This precaution was taken to ensure correct polarity. However, it is possible that unwanted radiation will be obtained if the ground lead is very long, as it might be if a water-pipe ground were to be used. Therefore, it is desirable to locate the ground lead in the a-c outlet you are using, and then connect both wires to the a-c plug so that both a-c connections are the same length. If the installation is to be temporary, then the ground clip connection may be used. If the incorrect polarity of a-c is used, the chassis will be off ground by 115 volts, and constitute a shock hazard. Further, the audio system will undoubtedly have excessive hum. Of course, all of this problem is avoided if another type of power supply using a transformer were to be used.

The i-f transformer in the grid of the 6BA6 and the i-f transformer in the plate of the 6BE6 must be altered, as only one-half of the transformer is used in each case. This alteration consists of removing one of the windings, and replacing this winding with 10 turns of No. 20 wire. This winding should be wound directly on the coil form, directly against the i-f transformer winding. Make sure that this 10 turn winding is placed on the proper end of the i-f coil, as shown in the diagrams.

The tubes specified are all miniature tubes. Other tube types may be used if desired. For example, a 6SG7 or a 6SK7 may be used instead of a 6BA6. Similarly, a 6SA7 can replace the 6BE6, a 6SR7 the 6BF6, and a 6SL7-GT, 6J6 or a 12AX7 used for the 12AT7. These substitutions should require no circuit changes.

APPLICATIONS

The uses to which these units may be put are limited only by the imagination of the owner. One obvious use is for remote control of a phone transmitter. The receiving unit is installed at the transmitter position, and the audio output fed into the speech amplifier. The relay is connected so that it turns on the plate voltage when the carrier from the remote unit is turned on. All that is necessary for remote operation is to turn on the filaments of the transmitter proper and also the remote receiver. Then, remote control is obtainable at any point where 115 volt a-c is available. Select your favorite easy chair, place your receiver and remote control unit beside it, and enjoy a qso.

C-w men may also employ these units for remote control by replacing the switch S_2 on the remote transmitting unit with a plug, into which the key may be inserted. The relay in the remote receiver must be of a fast type, which will respond to keying. The relay contacts may then be used to key the rig in the usual manner. In order to assure proper keying, the rheostat R_9 should be adjusted very carefully to give proper actuation of the relay.

Another use that these units may be put to is that of remote pickup for a phonograph. In this case the phonograph pickup is used as the source of audio, and fed into the remote transmitter. The remote receiver is located next to the regular receiver, and the audio out of the remote unit is fed into the phonograph jack.

Although the audio input on the remote transmitter is designed for high-impedance input, there is sufficient gain so that a magnetic pickup may also be used. The mismatch will waste some power, but the over-all gain of the unit is more than enough to overcome this.

SELENIUM RECTIFIER POWER SUPPLIES

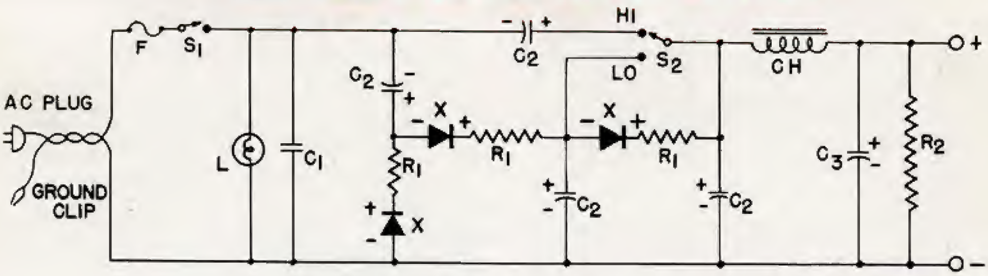

Fig. 8. Circuit Diagram of Utility Power Supply

CIRCUIT CONSTANTS

C_1 = 0.05 mf 600 v. paper
C_2 = 40 mf 450 volt electrolytic (see text)
C_3 = 32 mf 450 volt electrolytic
CH = 10.5 H, 110 ma. choke (Stancor C-1001)
F = 1.5 amp fuse
L = 6 watt 115 volt lamp

R_1 = 25 ohm 1 watt
R_2 = 0.125 meg 2 watt

S_1 = SPST toggle
S_2 = SPDT rotary

X = 100 ma. selenium rectifier (G-E 6RS5GH1)

Many types of low and medium voltage power supplies may be made in a simpler manner when G-E selenium rectifiers are employed. Use of this type of rectifier does away with a filament transformer. The size of the selenium rectifier allows it to be tucked into a convenient corner. Further, selenium rectifiers give off very little heat when used within their ratings.

These rectifiers may be thought of as half-wave diode units. As such, two of them might be used in a full-wave circuit in the same way that a rectifier tube is used. However, due to the inverse voltage rating (380 volts) selenium rectifiers find their main use in half-wave circuits, or in doubling, tripling or quadrupling applications. In all of these cases it is convenient to use the a-c line voltage directly, so that no power transformer is required.

With half-wave circuits 115 to 130 volts d-c may be obtained, whereas up to 500 volts d-c may be gotten with a voltage quadrupling circuit. The exact output voltage for each type of circuit will depend to some extent on the output current, due to the voltage regulation.

Utility power supplies for use around the shack, small power supplies for receivers or converters, bias supplies —all may be designed conveniently around the G-E selenium rectifier.

BIAS SUPPLY

The circuit diagram in Fig. 9 shows a full-wave doubling circuit which may be used either as a low voltage (200 volts) power supply or as a bias supply at the same voltage. Because this unit (Figs. 12 and 13) was designed primarily for use as a bias supply, a 50 ma choke is used, a large wattage bleeder resistor is specified, and the input voltage is obtained from a filament transformer. The 6.3 volts required on the input is usually available around a transmitter (about 1 amp is required) and the transformer provides isolation so that grid current metering may be accomplished more easily.

BIASING CONSIDERATIONS

A power supply which supplies grid bias to class C stages may be thought of as either supplying protective bias only, or as supplying the total operating bias. In the former case, where protective bias only is required, the supply is inserted in series with the grid resistor in the class C stage. When the power supply furnishes the total operating bias, the bleeder resistor (R_2) becomes the grid resistor for the class C stage.

For example, let us assume that our bias supply puts out 150 volts, when R_2 is 5000 ohms. Also, assume that we have a pair of GL-8000 tubes for which we require protective bias. For class C phone operation at 1600 plate volts these tubes require −300 volts bias. Normal grid current is 40 ma. for two tubes. We would therefore use a 2500 ohm grid resistor, and place the bias supply 5000 ohm resistor between the grid resistor and ground, so that a total of 7500 ohms is in the grid circuit.

When the GL-8000 tubes have no excitation, no grid current flows. However, the bias pack is supplying 150 volts of negative bias, which is more than enough to cut off plate current. If we now drive the GL-8000 tubes and 40 ma. of grid current flows, there will be a voltage drop of (.04) (2500) or 100 volts across the 2500 ohm resistor and a drop of (.04) (5000) or 200 volts across the bleeder resistor in the bias pack. This totals 300 volts, which is the bias required.

Note that 200 volts appears across R_2 in the bias pack, due to the 40 ma. of grid current. This voltage is higher than the bias pack can supply (150 v) so that effectively the bias supply is not even in the circuit. The 150 volts, and the 200 volts do not add together. As a matter of fact, the filament transformer (T) could be disconnected and the operation of the GL-8000 tubes would be unaffected, as long as excitation is supplied to them.

When bias packs are used to supply protective bias, as in the example, care should be taken to ensure that the component parts can stand the higher voltage that the grid current produces. This is the reason that 450 volt condensers are used at C_3.

If the bias supply is to furnish operating bias, another example may be used. Let us assume that we wish to provide operating bias of 125 volts to a single GL-812 operating under class C phone conditions. Normal grid current is 25 ma. Also, assume that when R_2 is adjusted to 4000 ohms the bias supply puts out 125 volts. The circuit is such that R_2 is the total grid resistor used. When the GL-812 has no excitation, the bias supply furnishes 125 volts of bias. When drive is applied, 25 ma. of grid current flows through 4000 ohms and gives a voltage of 100 volts. However, the bias supply is still supplying 125 volts, so that an additional 6.25 ma. of current is supplied by the bias supply. The total current (25 + 6.25) of 31.25 ma. through 4000 ohms gives us the 125 volts which we require.

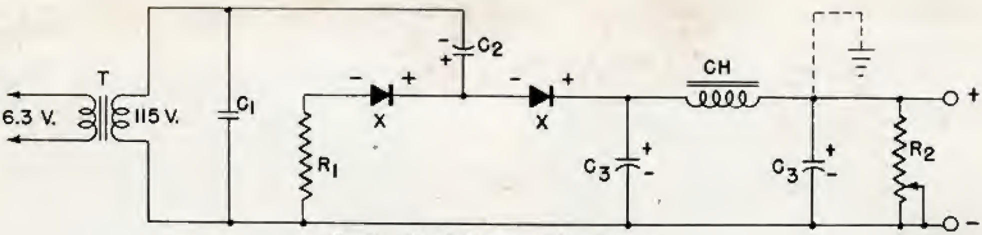

Fig. 9. Circuit Diagram of Bias Supply

CIRCUIT CONSTANTS

C_1 = 0.05 mf 600 volt paper
C_2 = 32 mf 450 volt electrolytic
C_3 = 40 mf 450 volt electrolytic (see text)
CH = 16 H, 50 ma choke (Stancor C-1003)
R_1 = 25 ohm 1 watt
R_2 = 5000 ohm 50 watt semiadjustable
T = 6.3 volt 1.2 amp (Stancor P-6134)
X = 100 ma. selenium rectifier (G-E 6RS5GH1)

CIRCUIT DETAILS

With reference to Fig. 9, Condenser C_1 is for "hash" filtering and is not critical. R_1 is a series protective resistor which limits capacitor charging current and protects the rectifiers if other components fail. Condenser C_2 and the condenser C_3 which is between the choke and the rectifier are the "doubling" capacitors, while the second C_3 serves as a filter capacitor.

The choke specified is a 50 ma. choke. If more current output is desired—up to 100 ma—a larger choke may be used. The bleeder resistor value of 5000 ohms is specified because the unit was designed for bias work. If the power supply is used only as a source of utility power, it is advisable to replace R_2 with a 47,000 ohm resistor. Otherwise, the low resistance will drain away most of the usable power.

CONSTRUCTION

Figs. 12 and 13 show the general layout used. A piece of aluminum 3½ inches wide and 12 inches long is bent into a "U" chassis which is 3 inches high and 6 inches long. Of course, any type of chassis may be used, and it may even be desirable to build this circuit right in the transmitter proper, if it is to be used for bias.

The G-E selenium rectifiers are mounted by 6–32 screws on one end. In order to provide maximum cooling for these rectifiers, always mount them close to the chassis and away from any heat-producing units, such as resistors.

The Sprague electrolytic condenser mounted on top serves as both sections of C_3. Actually, a 20-20-20-20 mf condenser was used, with two of the 20 mf sections wired in parallel for one C_3 and the other two similarly wired for the second C_3. The can of this condenser is the common negative and must be insulated from the chassis by means of the insulating washer furnished with the condenser. Shock hazard is prevented because of the cardboard covering on the body of the condenser.

C_2 is made up from two 16 mf electrolytics in parallel. These are mounted below chassis as shown in the photograph. The location of the parts is not critical. One terminal of the selenium rectifiers is marked with red paint. This is the + terminal as shown in the circuit diagram.

OPERATION

The voltage which this supply will produce is dependent on several factors. The no-load voltage (R_2 not in the circuit) will be in the order of 250 volts. When R_2 is in the circuit, the voltage will drop to approximately 175 volts, as R_2 is providing, in this case, a load of 35 ma. For bias supply purposes a higher value of resistance could be used in order to decrease the load and increase the voltage. Similarly, R_2 may be decreased by the tap so that the voltage is dropped to almost 100 volts. Resistor R_1 may also be increased in value, up to approximately 100 ohms, in order to decrease the output voltage.

The circuit diagram indicates that the positive lead may be tied to chassis. It is advisable to do this when the supply is used for bias. Otherwise, the chassis should be floating, with no connections made to it.

UTILITY POWER SUPPLY

The circuit diagram in Fig. 8 indicates how G-E selenium rectifiers may be employed in a power supply to provide a medium voltage of 250 volts or a higher voltage of approximately 325 volts. When switch S_2 is in the "LO" position, the circuit functions as a full-wave doubler circuit, and with the switch in the "HI" position, a tripler circuit is obtained. This is a very economical way to achieve dual voltages, because the lower voltage range is obtained at the expense of only one switch.

A power supply of this type (see Figs. 2, 10 and 11) is ideal for low-powered transmitters, such as those used for summer portable work. The absence of transformers makes the unit light weight, and the absence of rectifier tubes means that no warm-up is required. In addition, the entire unit is quite small, considering that it will power a 20-watt final. For winter-time use this power unit can serve as a convenient source

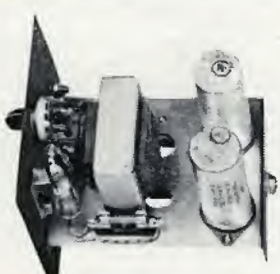

Fig. 10. Top View of Utility Power Supply

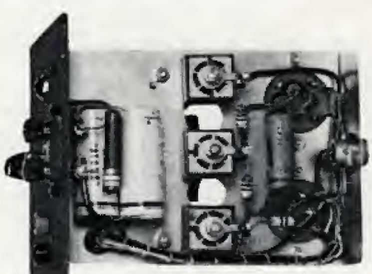

Fig. 11. Under View of Utility Power Supply

of power for experimental work, and it may also be used as a temporary source of bias voltage.

CIRCUIT DETAILS

Because one side of the a-c line is common to the negative lead, it is necessary to employ a special method of connecting to the a-c line. The circuit diagram (Fig. 8) shows that the "hot" lead is connected to a regular a-c plug, and the ground lead is connected to a ground clip. In use, the plug is inserted in an a-c outlet and the ground clip fastened to a ground, such as a water pipe, or a relay rack frame. If the pilot light does not light when switch S_1 is turned on, it is necessary to reverse the a-c plug. If a power supply of this type were to be used in a permanent installation, the ground clip could be done away with and the a-c plug properly polarized before it is connected.

As in the case of the bias supply just described, condenser C_1 is a "hash" filter, and condensers C_2 are the voltage multiplying condensers. Condenser C_3 forms part of the filter circuit. Resistors R_1 are the current limiting resistors.

Three G-E selenium rectifiers are required in order to obtain a tripling circuit. This is the case when switch S_2 is in the "HI" position. The "LO" position shorts out one of the selenium rectifiers and its current limiting resistor and also removes one of the condensers from the circuit. This position also parallels two of the 40 mf capacitors so that there is 80 mf of input capacity on the filter. This tends to raise the voltage a bit over what it would be if only 40 mf were used.

The choke in the filter is rated at 110 ma. This permits the maximum current to be drawn that the rectifiers are capable of supplying (100 ma.) without overloading. The bleeder resistor, R_2, is used primarily to drain the charge from the condensers, without taking too much current from the supply.

CONSTRUCTION

The unit has been constructed in a six by six by six inch box, which provides more than enough space for all the components. Fig. 2 shows the front view of the power supply. A male connector and two female connectors are shown on the left which are not indicated in the circuit diagram. They are designed to ground the box to either the positive or the negative lead of the power supply. The male connector is wired to a piece of one-fourth inch copper braid which ties under one of the panel screws. The two female connectors are wired to the plus and minus connections.

When the power supply is used in the normal manner, with the a-c plug properly inserted, the metal box would be connected to the minus lead. Further, if this power supply were used as a temporary source of bias, the positive lead would be connected to the case. In the event that the a-c plug is not inserted properly, or there is a chance that the a-c connections are reversed, then the male connector is left floating so that there is no electrical connection of any sort to the box. In wiring the unit, do not make any connections to chassis, and run the negative lead as just another "hot" wire.

Referring again to Fig. 2 the on-off switch is in the middle of the panel, with the "HI-LO" switch directly above it. The pilot lamp is on the right, and the plus and minus connections come out through a dual binding post on the bottom of the front panel.

Figs. 10 and 11 show the internal construction. A small chassis is bent out of a piece of aluminum to form a "U." The exact size is unimportant, although the chassis used was bent from a 4¾ inch wide piece 8 inches long. The front bend is ½ inch long and the rear bend 1½ inches long. The two Solar 20-20-20-20 mf electrolytic condensers (DY-4X20-450) are mounted on the rear of this chassis. They should be mounted with the insulating washer which is supplied with them. The can of these condensers should not be connected electrically to the chassis. The choke mounts on top, in the middle, leaving room for the front-panel components.

Note that two three-quarter inch holes are drilled in the middle of the chassis. These holes permit better ventilation for the three G-E selenium rectifiers which are mounted flat against the underside of the chassis (Fig. 11). Condenser C_3 is also mounted under the chassis, near the front panel. This condenser is two 16 mf electrolytic condensers connected in parallel.

A two-contact connector (Amphenol 80-PC2M) is used as the a-c connector. It is necessary to use either a polarized connector of this sort, or to run an a-c cord directly out of the unit. Either method will work equally well. The two-contact connector is mounted on the rear of the chassis. A hole is cut in the box so that this connector protrudes through.

OPERATION

The following table shows the voltages to be expected at various load currents:

Load Current (ma.)	Output Voltage	
	Doubling	Tripling
100	227	268
90	235	278
80	240	288
70	250	300
60	260	312
50	270	325
40	280	338
30	290	350
20	300	363
10	310	378

The above values of voltage were those actually measured with the unit shown. They will be subject to variation from unit to unit, but they give an

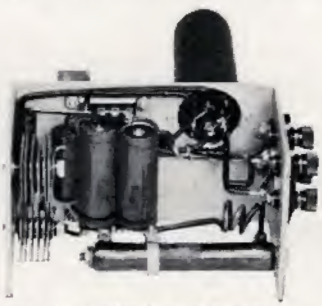

Fig. 12. Under View of Bias Supply

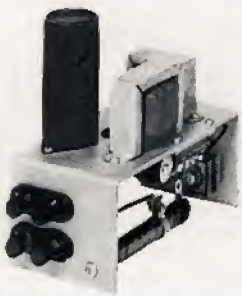

Fig. 13. Front View of Bias Supply

approximate idea of the voltages obtainable. The exact value of resistors R_1, and the resistance of the choke will tend to change the output voltage, as will the exact capacitance of the electrolytic capacitors used.

If the power supply is to be used near full load for long periods of time, it is advisable to check the heat rise of the components to ensure that they do not overheat. Caution: If the power supply is operated when not in its box, the cases of the two electrolytic capacitors will be above ground and therefore constitute a possible shock hazard.

TECHNICAL INFORMATION

G-E SELENIUM RECTIFIERS

General Electric selenium rectifiers have an exceptionally high inverse peak voltage rating, and the inverse current is extremely low, even with peak voltages up to 350 volts, which is the maximum encountered under usual conditions of operation.

The forward voltage drop through the rectifier is extremely low, being approximately 5 volts at rated current output.

When using a G-E selenium rectifier, it will be found that the inverse leakage current is very low. As the leakage current is included in the measurement of the rms current, this tends to keep the rms heating current at a relatively low value. The values of rms current and peak current given in the tabulation below are consistent with the d-c current ratings in all cases. These are based on 50 C or 60 C ambient temperatures.

RATINGS OF GENERAL ELECTRIC SELENIUM RECTIFIERS

	Model 6RS5GH1		Model 6RS5GH2	
	50 C	60 C	50 C	60 C
Normal rms volts	117	117	117	117
Maximum rms volts	130	130	130	130
Maximum inverse peak volts	380	380	380	380
Maximum peak current	1000 ma	750 ma	800 ma	650 ma
Maximum rms current	250 ma	187 ma	200 ma	163 ma
Maximum d-c current	100 ma	75 ma	80 ma	65 ma

(Approximate rectifier voltage drop is 5 volts)

CQ . . . CQ . . . When you send in questions to me, please indicate whether your question is an entry for Questions and Answers or whether you desire an immediate answer.

Lighthouse Larry

Electronics Department

GENERAL ELECTRIC

Schenectady, N. Y.

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